

4.7.2.6 Savannah River Site

4.7.2.6.1 Land Resources

In addition to the storage alternatives, SRS is being considered as a site for the six other DOE programs identified in Table 4.7.1–1. The total area of undisturbed land that could be affected by these programs during operation is 223 ha (550 acres), or less than 0.3 percent of the total land at SRS. Site development would be performed in accordance with the land-use plans in the SRS Site Development Plan. Proposed development would also be compatible with the industrial use visual character of the developed areas of SRS. Cumulatively, the actions would consume land but would be consistent with the land use plans and visual character of the site.

4.7.2.6.2 Site Infrastructure

Some cumulative impacts are possible at SRS resulting from implementation of the storage alternatives and the other six DOE programs identified in Table 4.7.1–1. The site infrastructure cumulative impacts that would result at SRS from operation of all of the proposed alternatives are shown in Table 4.7.2.6.2–1. The cumulative requirements for energy, peak load, oil, and coal would exceed the site availability at SRS. Transmission lines, electrical distribution equipment, and oil storage tanks would need to be constructed to satisfy the new resource requirements. Additional coal requirements would be satisfied using existing procurement practices.

Table 4.7.2.6.2–1. Site Infrastructure Cumulative Operation Impacts at Savannah River Site

Requirement	Electrical		Fuel	
	Energy (MWh/yr)	Peak Load (MWe)	Oil (l/yr)	Coal (t)
No Action	794,000	116	28,390,500	221,352
Storage and Disposition ^a	76,000	13	47,000	4,800
Foreign Research Reactor Spent Nuclear Fuel	1,500	NA	NA	NA
HEU Disposition	5,000	NA	56,800	360
Spent Nuclear Fuel	24,400	NA	0	0
Stockpile Stewardship and Management	9,700	1.6	28,400	1,090
Tritium Supply/Recycling	3,740,000	550	13,200	0
Waste Management	NA	13.7	NA	NA
Cumulative Requirement	4,790,600	694.3	32,135,900	227,602
Site Availability	1,672,000	330	28,390,500	221,352

^a Collocation Alternative.

Note: NA=data was not analyzed in the associated EIS.

Source: DOE 1995i; DOE 1995p; DOE 1995cc; DOE 1996b; DOE 1996g; DOE 1996m; Table 4.2.6.2–1.

4.7.2.6.3 Air Quality and Noise

Cumulative impacts to air quality at SRS include impacts from the No Action Alternative, the other seven DOE programs identified in Table 4.7.1–1, and the proposed facilities for each alternative. Concentrations are calculated for these emissions and are then compared to Federal and State regulations and guidelines to determine compliance.

The SRS is currently in compliance with the NAAQS as well as State regulations and guidelines. Air emissions attributable to the storage alternatives would increase concentrations of criteria pollutants. Potential cumulative impacts are presented in Table 4.7.2.6.3–1. The resulting concentrations from cumulative impacts would be in compliance with Federal and State regulations.

Table 4.7.2.6.3-1. Estimated Cumulative Operational Concentrations of Pollutants at Savannah River Site and Comparison With Most Stringent Regulations or Guidelines—No Action and Storage Alternatives

Pollutant	Averaging Time	Most Stringent Regulations or Guidelines ^a (µg/m ³)	No Action (µg/m ³)	Other Onsite Activities ^b (µg/m ³)	Upgrade ^c (µg/m ³)	Consolidation (µg/m ³)	Collocation (µg/m ³)
Criteria Pollutants							
Carbon monoxide	8-hour	10,000 ^d	22	41.88	64.05	66.03	66.28
	1-hour	40,000 ^d	171	107.1	278.9	288.2	289.4
Lead	Calendar Quarter	1.5 ^d	0.0004	0.00003	0.00043	0.00043	0.00043
Nitrogen dioxide	Annual	100 ^d	5.7	3.53	9.33	10.15	10.31
Ozone	1-hour	235 ^d	e	e	e	e	e
Particulate matter less than or equal to 10 microns in diameter	Annual	50 ^d	3	1.125	4.135	4.185	4.195
	24-hour	150 ^d	50.6	5.68	56.43	57.51	57.72
Sulfur dioxide	Annual	80 ^d	14.5	0.386	15.18	16.34	16.67
	24-hour	365 ^d	196	19.09	220.7	243.1	249.6
	3-hour	1,300 ^d	823	112.2	971.9	1116	1158
Mandated by South Carolina							
Total suspended particulates (TSP)	Annual	75 ^f	12.6	2.065	14.68	14.73	14.74
Gaseous fluorides (as HF)	30-day	0.8 ^f	0.09	0.019	0.109	0.109	0.109
	7-day	1.6 ^f	0.39	0.067	0.457	0.457	0.457
	24-hour	2.9 ^f	1.04	0.175	1.215	1.215	1.215
	12-hour	3.7 ^f	1.99	0.327	2.317	2.317	2.317

Table 4.7.2.6.3-1. Estimated Cumulative Operational Concentrations of Pollutants at Savannah River Site and Comparison With Most Stringent Regulations or Guidelines—No Action and Storage Alternatives—Continued

Pollutant	Averaging Time	Most Stringent Regulations or Guidelines ^a (µg/m ³)	No Action (µg/m ³)	Other Onsite Activities ^b (µg/m ³)	Upgrade ^c (µg/m ³)	Consolidation (µg/m ³)	Collocation (µg/m ³)
Hazardous and Other Toxic Compounds							
Benzene	24-hour	150 ^d	31.71	0.001	31.71	31.71	31.71
Chlorine	24-hour	75 ^f	7.63	0	7.63	7.63 ^g	7.63
Hydrogen chloride	24-hour	175 ^f	h	0	h	<0.01 ^g	<0.01 ^g
Hydrazine	24-hour	0.5 ^f	h	0	h	<0.01 ^g	<0.01 ^g
Nitric acid	24-hour	125 ^f	50.96	4.76	55.72	55.72	55.77
Phosphoric acid	24-hour	25 ^f	0.462	0	0.462	0.462	0.462
Sulfuric acid	24-hour	10 ^f	h	0	h	<0.01 ^g	<0.01 ^g

^a The more stringent of the Federal and State standard is presented if both exist for the averaging period.

^b Other onsite activities include those associated with the Foreign Research Reactor Spent Nuclear Fuel, HEU Disposition, Interim Management of Nuclear Materials, Spent Nuclear Fuel Management, Stockpile Stewardship and Management, Tritium Supply/Recycling, and Waste Management Programs.

^c Applies to the New F-Area Facility option.

^d Federal and State standards.

^e Ozone, as a criteria pollutant, is not directly emitted nor monitored by the site. See Section 4.1.3 for a discussion of ozone-related issues.

^f State standard or guideline.

^g The concentration represents the alternative contribution and other onsite activities.

^h No sources of this pollutant have been identified.

Note: Concentrations are based on site contribution and do not include the contribution from non-facility sources.

Source: 40 CFR 50; DOE 1995p; DOE 1996b; DOE 1996g; SC DHEC 1991a; SC DHEC 1992b; SR DOE 1994a; SR DOE 1994e; SR DOE 1995b; SR DOE 1995e; WSRC 1994e; Table 4.2.6.3-1.

Cumulative noise impacts include contributions from existing and planned facilities plus proposed storage facilities at the site. Noise impacts may result both from onsite noise sources and from offsite sources, such as traffic. Noise impacts on individuals from the storage facilities are expected to be small, resulting in little or no increase in noise levels at offsite areas. Little or no increase in cumulative noise impacts to individuals offsite is expected to occur.

4.7.2.6.4 Water Resources

Table 4.7.2.6.4–1 summarizes the estimated cumulative annual water requirements for the storage alternatives and the six other DOE programs identified in Table 4.7.1–1. Water requirements during operation of all the proposed projects would be obtained from existing or new well fields at SRS and from the Savannah River. The cumulative water requirements for the site would be a 4-percent increase over projected No Action water usage. Suitable groundwater from the deep aquifers at the site is abundant and aquifer depletion is not a problem. The proposed Collocation Alternative would account for 0.3 percent of the total cumulative water usage.

Table 4.7.2.6.4–2 summarizes the estimated treated wastewater discharge to the Savannah River. The cumulative wastewater discharge to the river would be 0.02 percent of the average Savannah River flow (283 m³/s [9,994 ft³/s]), and 0.04 percent of the Savannah River minimum flow (152 m³/s [5,368 ft³/s]). The proposed Collocation Alternative would account for approximately 17 percent of the total annual cumulative wastewater discharge. The expected total cumulative wastewater discharge to the tributaries would continue to meet NPDES limits and reporting requirements. Existing SRS treatment facilities could accommodate all the new cumulative processes and wastewater streams if a new facility is built for tritium supply and recycling operations as planned.

[Text deleted.]

Table 4.7.2.6.4–1. Cumulative Annual Water Usage at Savannah River Site

Program	Water Requirement (million l/yr)
No Action	140,247 ^a
Storage and Disposition	460 ^b
Foreign Research Reactor Spent Nuclear Fuel	1.9
HEU Disposition	2.1
[Text deleted.]	
Spent Nuclear Fuel	49
Stockpile Stewardship and Management	46
Tritium Supply and Recycling	4,735
Waste Management	325 ^c
Total annual cumulative water usage	145,883.1

^a Includes both groundwater and surface water usage (13,247 million l/yr from groundwater and 127,000 million l/yr from surface water).

^b Collocation Alternative.

[Text deleted.]

^c Based on preliminary data.

[Text deleted.]

Source: DOE 1995i; DOE 1995p; DOE 1995cc; DOE 1995dd; DOE 1996b; DOE 1996g; DOE 1996m; SR DOE 1994b; SR DOE 1995b; SRS 1995a:1; Table 4.2.6.4–1.

Table 4.7.2.6.4–2. Cumulative Annual Wastewater Discharge at Savannah River Site

Program	Nonhazardous Sanitary and Industrial Wastewater (million l/yr)
No Action	700
Storage and Disposition	215
Foreign Research Reactor Spent Nuclear Fuel	1.6
HEU Disposition	18.7
[Text deleted.]	
Spent Nuclear Fuel	49
Stockpile Stewardship and Management	46
Tritium Supply and Recycling	143
Waste Management	83 ^a
Total annual cumulative wastewater	1,256.3

^a Based on the highest treated volumes from the alternative scenarios.

[Text deleted.]

Source: DOE 1995i; DOE 1995p; DOE 1995cc; DOE 1995dd; DOE 1996b; DOE 1996g; DOE 1996m; SR DOE 1994b; SR DOE 1995b; SRS 1995a:1; Table 4.2.6.4–1.

4.7.2.6.5 Geology and Soils

Cumulative impacts to geologic and soil resources are expected to be minor as a result of the storage alternatives and the other DOE programs identified in Table 4.7.1–1. A total of 223 ha (550 acres) could be disturbed at the site. Soil erosion and storm water control measures would be used during construction to minimize erosion from the disturbed areas. No valuable geologic resources would be affected by any of the planned programs.

4.7.2.6.6 Biological Resources

In addition to ongoing activities and the Storage Alternatives, SRS is being considered for the other DOE programs identified in Table 4.7.1–1. While a number of these would be located within existing structures or developed areas of SRS, others would be constructed at undisturbed sites. The total area of undeveloped land used by new facilities would be 223 ha (550 acres), or about 0.3 percent of the total SRS area. Discharges from the proposed facilities would be directed to a number of site waterbodies, thus increasing the possibility of cumulative impacts to wetlands and aquatic resources in these waterbodies. The cumulative loss of habitat could lead to additional impacts to special status species compared to those resulting from construction of a storage facility alone; however, their status on SRS would not be expected to be jeopardized. Species that could be affected include green-fringed orchid, nailwort, beak-rush, [text deleted], Florida false loosestrife, Cooper's hawk, and eastern tiger salamander. Red-cockaded woodpeckers colonies are located far enough from the sites that they would not be affected by the facilities.

4.7.2.6.7 Cultural and Paleontological Resources

The six other DOE programs identified in Table 4.7.1–1 may require ground-disturbing construction, facility modification, and changes in land access and use at SRS. New construction is proposed for some currently undeveloped land within SRS under both the Tritium Supply and Recycling and Storage and Disposition programs. Portions of this undeveloped land have been surveyed and contain NRHP-eligible resources which may be affected by construction. Building modification is also proposed under several programs. Facilities at SRS have not been reviewed for NRHP-eligibility, but many may be eligible based on their association with the Cold War. Specific surveys, evaluations, and Native American consultations would be conducted pursuant to NHPA, the American Indian Religious Freedom Act, and the Native American Graves Protection and

Repatriation Act. There is potential for moderate cumulative impacts to cultural resources at SRS based on the presence of sites and facilities that have been or are likely to be determined eligible for listing on the NRHP.

4.7.2.6.8 Socioeconomics

Cumulative impacts on SRS's regional economy, population, housing, community services, and local transportation would be minor. Generally, the regional economy would improve without burdening the housing market, but new traffic could cause congestion on local roads. Because each of the other six DOE programs identified in Table 4.7.2.6.8–1 is relatively small, their cumulative socioeconomic impact is expected to be minor. The primary impact will be to stimulate regional economic growth. If all of these programs were located at SRS, transportation congestion and the demand for new housing and other public services could increase. However, housing construction trends indicate that this additional population could be accommodated without significant impacts to the housing market.

Table 4.7.2.6.8–1. Socioeconomic Cumulative Impacts at Savannah River Site

Program	Direct Employment ^a
Storage and Disposition ^b	614
Foreign Research Reactor Spent Nuclear Fuel	30
HEU Disposition	125
Spent Nuclear Fuel	0
Stockpile Stewardship and Management	810
Tritium Supply/Recycling	600
Waste Management	5,670
Total	7,849

^a Operations.

^b Collocation Alternative.

Source: DOE 1995i; DOE 1995p; DOE 1995cc; DOE 1996b; DOE 1996g; DOE 1996m; Section 4.2.6.8.

4.7.2.6.9 Public and Occupational Health and Safety

Radiological Impacts. The maximum incremental radiological doses and resulting health effects for the storage alternative, the No Action Alternative and other actions planned at SRS, are presented in Table 4.7.2.6.9–1. Although these impacts could be added, it should be noted that the exact locations of the facilities for planned actions may change. In addition, because each of these facilities is sited in a different location, the location of the MEI for each is also different. The MEIs have been selected to maximize the potential dose for a given facility. Since the MEI would have to be resident at more than one location simultaneously in order to receive the maximum dose from each facility, summing the doses would be misleading. The offsite population and total site workforce doses have not been summed because the population distribution and workforce totals as analyzed vary among the actions. [Text deleted.]

Chemical Impacts. For SRS, the various NEPA documents use different but otherwise acceptable methodologies to assess the health effects from hazardous chemical exposure for proposed activities. These methodologies may have different indicators for determining the health impact (for example, hazard index, cancer risk, or chemical concentration in the environment). These different indicators prevent a uniform quantitative cumulative impact analysis for this site. However, as indicated in the health impact analysis sections in the NEPA documents for the proposed actions, the health effect from any proposed action at SRS is predicted to contribute only slightly to the impacts from the baseline activity (No Action). The potential cumulative health impact from hazardous chemicals from implementation of the proposed activities would not exhibit a noticeable increase above the baseline, would be expected to fall within acceptable regulatory limits.

Table 4.7.2.6.9–1. Estimated Average Annual Cumulative Radiological Doses and Resulting Health Effects to the Public and Workers From Normal Operation at Savannah River Site

Program	Maximally Exposed Member of the Public		Offsite Population Within 80 km		Total Site Workforce	
	Total Dose (mrem)	Fatal Cancer Risk	Total Dose (person-rem)	Number of Fatal Cancers	Total Dose (person-rem)	Number of Fatal Cancers
No Action	0.79	4.0×10^{-7}	44	0.022	259	0.090
Storage and Disposition ^a	1.4×10^{-5}	7.0×10^{-12}	8.8×10^{-4}	4.4×10^{-7}	25	0.010
Foreign Research Reactor Spent Nuclear Fuel	1.8×10^{-4}	9.0×10^{-11}	0.010	5.3×10^{-6}	32	0.013
HEU Disposition	2.5×10^{-3}	1.3×10^{-9}	0.16	8.0×10^{-5}	11.3	4.5×10^{-3}
[Text deleted.]						
Spent Nuclear Fuel	0.50	2.5×10^{-7}	18.4	9.2×10^{-3}	76	0.034
Stockpile Stewardship and Management	1.0×10^{-5}	5.0×10^{-12}	5.9×10^{-4}	3.0×10^{-7}	156	0.062
Tritium Supply and Recycling ^b	2.5	1.2×10^{-6}	210	0.11	42	0.017
Waste Management	0.033	1.7×10^{-8}	1.5	7.5×10^{-4}	81	0.032
[Text deleted.]						

^a The impacts from the collocation storage facility are presented since they encompass both Pu and HEU storage.

^b Accelerator Production of Tritium Alternative.

Source: DOE 1995i; DOE 1995p; DOE 1995cc; DOE 1995dd; DOE 1996b; DOE 1996g; DOE 1996m; Tables 4.2.6.9–1 and 4.2.6.9–2.

4.7.2.6.10 Waste Management

Cumulative impacts to waste management at SRS could arise from any of the reasonably foreseeable future actions as identified in Table 4.7.2.6.10–1. The largest potential contribution to cumulative impacts would result from the Waste Management PEIS if SRS were selected as a regional site for HLW storage, TRU waste treatment and storage, and mixed LLW and LLW treatment and disposal site. The Collocation Alternative for the Storage and Disposition PEIS would contribute to the cumulative impacts for LLW.

Table 4.7.2.6.10-1. Waste Management Cumulative Impacts at Savannah River Site (2005)—Annual Volumes

Category	Foreign Research Reactor			Stockpile			Total (m ³)
	No Action ^a (m ³)	Storage and Disposition ^b (m ³)	Spent Nuclear Fuel (m ³)	HEU EIS ^c (m ³)	Spent Nuclear Fuel Management (m ³)	Stockpile and Management ^d (m ³)	
Spent Fuel	0	0	1.4 t	0	0.4 t	0	2 t
High Level							
Liquid	126	0	0	0	0	0	126
Solid	3,525	0	0	0	0	0	4,060
Transuranic							
Liquid	0	0.02	0	0	0	28	28
Solid	338	2	0	0	20	129	934
Mixed Transuranic							
Liquid	0	0	0	0	0	0	0
Solid	Included in TRU	4	0	0	0	11	15
Low-Level							
Liquid	74,000	2.1	0	22	0	80	74,100
Solid	16,400	1,260	673	76	400	88	46,150
Mixed Low-Level							
Liquid	1,330	0.2	NA	46	0	0	1,380
Solid	7,970	66	NA	0	0	5	8,110
Hazardous							
Liquid	1,260	2	NA	88	NA	0.5	1,350
Solid	15,100	2	NA	0	NA	0	15,300
Nonhazardous (Sanitary)							
Liquid	703,000	195,780	NA	18,800	NA	46,200	1,870,000
Solid	61,200	18 ^j	NA	410	NA	1,450	64,000

Table 4.7.2.6.10-1. Waste Management Cumulative Impacts at Savannah River Site (2005)—Annual Volumes—Continued

Category	No Action ^a (m ³)	Storage and Disposition ^b (m ³)	Foreign Research Reactor Spent Nuclear Fuel (m ³)	HEU EIS ^c (m ³)	Spent Nuclear Fuel Management (m ³)	Stockpile Stewardship and Management ^d (m ³)	Tritium Supply and Recycling (m ³)	Waste Management (m ³)	Total (m ³)
Nonhazardous (Other)									
Liquid	Included in sanitary	Included in sanitary	38,450	Included in sanitary	NA	Included in sanitary	Included in sanitary	35,417 ^k	74,600
Solid	Included in sanitary	2,300 ^l	NA	410 ^l	NA	1,450 ^l	0	NA	4,160

^a No Action volumes from Table 4.6.2.10-1.

^b Collocation Alternative (New Pu and HEU Storage Facility).

^c Blending HEU to 4 percent LEU as UNH.

^d Pit Fabrication Alternative.

^e Represents HLW Regionalized Alternative 1, in which SRS would receive a total of 300 canisters from West Valley Demonstration Project for storage awaiting availability of geologic repository. Receipt of 100 canisters per year was assumed (Draft Waste Management PEIS, Vol. I of IV, Table 9.1-1, page 9-3).

^f Represents TRU waste Regionalized Alternatives 2 and 3, in which SRS would treat its TRU waste and contact-handled TRU waste from several other facilities. The volume was obtained by taking the estimated inventory at SRS plus the estimated inventory and 20-year generation projection for offsite facilities and dividing by 20 to get an annual estimate (Draft Waste Management PEIS, Vol. I of IV, Table 8.1-1, page 8-4).

^g Represents LLW Regionalized Alternatives 6 and 7, in which SRS disposes of wastes, its LLW, and LLW from several other facilities. The volume was obtained by taking the estimated inventory at SRS plus the estimated inventory and 20-year generation projection for offsite facilities and dividing by 20 to get an annual estimate (Draft Waste Management PEIS, Vol. I of IV, Table 7.1-1, page 7-3).

^h Represents mixed LLW Regionalized Alternative 2, in which SRS treats and disposes of its mixed LLW and mixed LLW from several other facilities. The volume was obtained by taking the estimated inventory at SRS plus the estimated inventory and 20-year generation projection for offsite facilities and dividing by 20 to get an annual estimate (Draft Waste Management PEIS, Vol. I of IV, Table 6.1-1, page 6-3).

ⁱ Represents hazardous waste Regionalized Alternative 1, in which SRS would treat onsite approximately 55 percent of its hazardous waste with the remainder going to commercial facilities. One metric ton of hazardous waste is approximately 1 cubic meter in volume (Draft Waste Management PEIS, Vol. I of IV, Table 10.3-7, page 10-20).

^j Upgrade with RFETS and LANL material Alternative.

^k Represents the total incremental wastewater over No Action for all alternatives. Annual volume estimated by assuming 365 days per year (Draft Waste Management PEIS, Vol. II, Tables II-16.4-8 [HLW], page 16-55; II-16.3-11 [TRU], page 16-45; II-16.2-12 [LLW], page 16-32; II-16.1-16 [mixed LLW], page 16-18; and II-16.5-10 [hazardous], page 16-67).

^l Recyclable wastes.

Note: NA=data was not analyzed in the associated PEIS.

Source: 60 FR 28680; 60 FR 63878; 60 FR 9441; 61 FR 25092; DOE 1995i; DOE 1995p; DOE 1995cc; DOE 1995dd; DOE 1996b; DOE 1996g; DOE 1996m; SR DOE 1995b; SR DOE 1995c; SR DOE 1995e; Table 4.2.6.10-1.